SERVICES DIRECTORY
TECHNICAL SERVICES DIVISION

Engineering Research and Development Bureau

Materials Bureau

Soil Mechanics Bureau

Second Edition

New York State Department of Transportation

Mario M. Cuomo, Governor *Franklin E. White, Commissioner*

TECHNICAL SERVICES DIVISION

MISSION: To provide materials and geotechnical engineering services and targeted engineering research in a timely and cost-effective manner for the Department and other governmental agencies.

This is accomplished through:

* Development and recommendation of engineering policies, standards, and specifications.
* Management of a quality assurance program for materials incorporated into Department projects.
* Conduct of specialized engineering studies requiring investigations, testing, analysis, and recommendations.

The values we prize:

PEOPLE
TEAMWORK
EXCELLENCE
SERVICE
INTEGRITY

FOREWORD

The mission of the Technical Services Division is to provide materials and geotechnical engineering services and targeted engineering research in a timely and cost-effective manner for the Department and other government agencies. This is accomplished through development and recommendation of engineering policies, standards and specifications; design and construction support for various materials and soils related features; management of a quality assurance program for materials incorporated into Department projects; and conduct of specialized engineering studies requiring investigations, testing, analysis and recommendations.

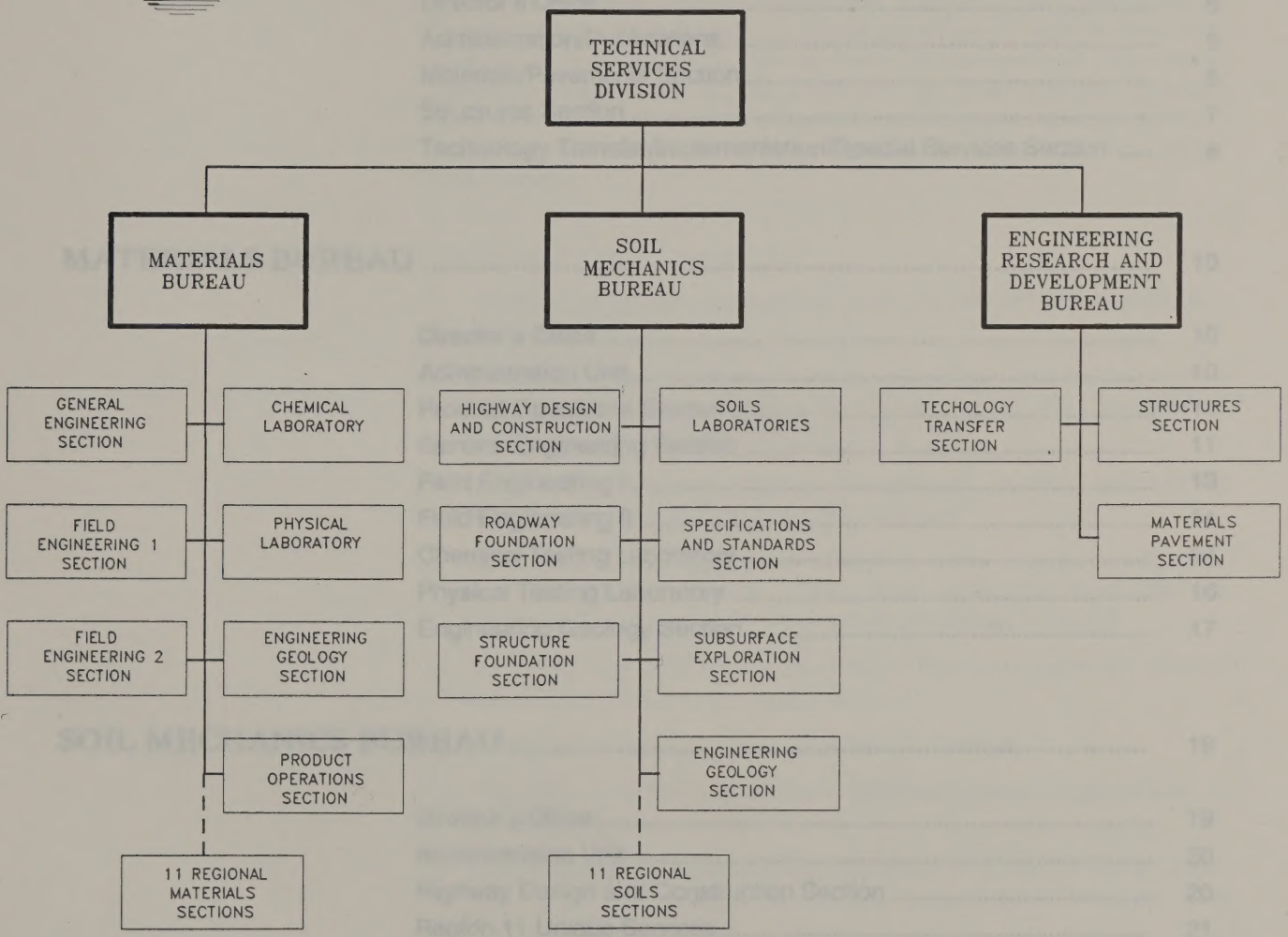
The Technical Services Division Director is the principal representative for New York State to the Transportation Research Board (TRB), a unit of the National Research Council and the nation's foremost organization for exchange of transportation information. Through TRB, the Department helps plan and monitor the National Cooperative Highway Research Program (NCHRP). The Division Director also serves as the New York coordinator for the Strategic Highway Research Program (SHRP), another major national research initiative. Several Division staff members are also active in the ongoing work of such organizations as the American Association of State Highway and Transportation Officials (AASHTO), the American Society for Testing and Materials (ASTM), the University Research Transportation Consortium (URTC), and many specialized national technical and professional societies.

This Directory is the second edition of a Directory initially developed as part of a Division Operational Goal in 1989. The Second Edition includes an update of many of the general functions of each of the three bureaus as well as reflects the major reorganization as a result of the Division down-sizing in 1991. The Directory, originally prepared by A. Donald Emerich, James J. Finke and Gerald R. Perregaux under the direction of Wesley P. Moody, is intended for circulation to new and current Division staff, regional Soils and Materials personnel and others interested in the services available in the Technical Services Division.

September 1, 1992

NYSDOT
Library
50 Wolf Road, POD 34
Albany, New York 12232

NEW YORK STATE DEPARTMENT OF TRANSPORTATION



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ENGINEERING RESEARCH AND DEVELOPMENT BUREAU

It is the mission of the Engineering Research and Development Bureau to manage a targeted engineering research and development program to enhance the quality and cost-effectiveness of engineering policies, practices, procedures, standards, and specifications. Activities performed to accomplish this mission include applied research, product evaluation, technical assistance, technology transfer, and engineering consultation.

The Bureau fulfills this mission by:

- Soliciting research suggestions from Department employees and the private sector;
- Evaluating each suggestion and providing information and a recommendation concerning its disposition to the Engineering Research Technical Advisory Panel (ERTAP);
- Conducting in-house, high-priority research studies selected by ERTAP and approved by the Chief Engineer;
- Submitting ERTAP-approved studies to other research programs, such as NCHRP, FHWA, UTRC, when adequate resources are unavailable or the problem is regional or national in scope;
- Providing technical assistance through literature searches, consultation, presentations, and training;
- Aiding in the implementation of research findings;
- Maintaining current awareness in technical areas of high priority to the Department;
- Coordinating the Department's responses to various Federal activities, such as pooled-fund studies, experimental features, and demonstration projects;
- Supporting other national or regional research activities such as SHRP, UTRC, NCHRP, and TRB;
- Assessing and distributing technical information;
- Providing statistical, instrumentation, and editing assistance.

The Engineering Research and Development Bureau is comprised of the Director's office, three engineering sections, and an administration/ publication section with the following responsibilities:

DIRECTOR'S OFFICE

The Director's office provides overall management for the Engineering Research and Development program and directly manages and supervises all the Bureau's activities. The Director's office is the focal point for contact with upper Department management, regions, industry, FHWA, and other research-related activities, such as SHRP, NCHRP, UTRC, and TRB.

ADMINISTRATION/PUBLICATIONS SECTION

Services Provided

- ❑ Distributes Bureau reports and other publications.
- ❑ Maintains the Research library.
- ❑ Edits and illustrates publications manuscripts.
- ❑ Produces the Research Digest and formal papers (TRB, etc.).
- ❑ Coordinates contacts with Transportation Research Information Service.
- ❑ Provides Bureau administrative support.

Capabilities/Equipment

- ❑ Maintains access to the DIALOG Data Base.
- ❑ Retrieves literature from the State Library System.
- ❑ Facilitates use of AASHTO Electronic Mail Bulletin Board.
- ❑ Microfiche reader.

MATERIALS/PAVEMENTS SECTION

Services Provided

- ❑ Conducts research to develop new or improved specifications for construction and maintenance materials.
- ❑ Confirms or develops design, construction, and maintenance practices that promote effective, economical use of materials.
- ❑ Develops design, construction, and maintenance practices that result in more economical pavements, improved service, optimized performance, and extended service life.

- Provides technical assistance to the Department in the subject areas of materials and pavements.
- Coordinates SHRP activities for the long-term pavement performance project.
- Performs structural analysis of pavements.

Capabilities/Equipment

- Data Logger Fluke Model 2280B reads up to 1500 Channels.
- Faultmeters - measures pavement faulting.
- Three Benkelman beams - measures pavement deflection.
- Pinning bars - measures horizontal slab movement at joints.
- Differential Vertical Joint Movement Device - measures vertical slab movement at joints.
- Walk-in freezer.
- Projection Tachistoscope Model 41010-A - controls the time a slide is visible.
- Two l6-mm electric normal speed cameras.
- Camera power pack.
- Camera tripods.
- Electronic data recorders (Racal Store 4 DS).
- Digital oscilloscope (Nicolet Model 2090-III with 206 processor).
- Analog recorder (Gulton Model TR 2000).
- X-Y recorder (Hewlett-Packard) 7015A.
- l6-mm film editor (Kalart Craig).
- l6-mm variable speed film projector.
- Video equipment - color video camera, video cassette recorder, and portable video cassette recorder.
- Two digital thermometers.
- Portable generators - two Homelites.
- DARWIN (Design Analysis Rehabilitation for WINdows) - a computer program for structural pavement design according to the 1986 AASHTO Guide for Design of Pavement Structures.

STRUCTURES SECTION

Services Provided

- Conducts research to develop and verify new structural design techniques and refine existing methods.
- Performs load-capacity evaluations of existing structures through physical testing and analysis.
- Evaluates equipment and procedures for bridge inspection and evaluation.
- Performs mathematical analyses of unique structural configurations.
- Provides assistance for structural evaluation and monitoring.
- Provides technical assistance to the Department in the area of structures.
- Performs finite element analysis.

Capabilities/Equipment

- Static data logger - 80 strain-gage channels, 30 thermocouple channels.
- Dynamic data logger - Eight channels with individual signal conditioning. Sample rate to 5000 per sec per channel.
- Structural testing laboratory - 26- by 60-ft floor, 30-kip capacity tiedowns at 2 ft centers, 5-ton overhead crane.
- Fourier analyzer - a specialized electronic data processing system that measures vibrational responses of a structure - four-channel capability, frequency span from DC to 20 kHz.
- Modal Analysis Equipment - three different modally tuned impact hammers with load cells and accelerometers.
- IPX Sun Workstation with C and FORTRAN compilers.
- The following software packages perform or support data analysis:
  - GIFTS (finite element analysis).
  - STARMODAL (modal analyses program).
  - WINDOWS (software utility package).
  - MATHCAD (mathematical software package).
  - Fortran 77, Q Basic, Basic, Microsoft Fortran 5.1 and C.
  - DADISP (digital signal processing package)
  - ADINA (finite element package for solids and structures - linear and nonlinear analysis).

TECHNOLOGY TRANSFER/IMPLEMENTATION/ SPECIAL SERVICES SECTION

Services Provided

- Conducts engineering research to develop or improve specifications and practices in areas not directly related to structures, pavements, or materials.
- Provides technology transfer and consultation services to the Department in various engineering subject areas.
- Provides statistical consultation.
- Coordinates Department activities with the following transportation programs:
  - Federal technology transfer program.
  - UTRC.
  - FHWA pooled-fund studies.
  - Federal demonstration projects.
  - FHWA experimental features program.
  - NCHRP.
  - Rural Technology Assistance Program (RTAP).
- Administers implementation of Engineering Research and Development Bureau research results within the Department.
- Provides engineering consultation services to facilitate library services involving the DIALOG data base.
- Reviews and coordinates with research and technology transfer centers for awareness of projects ongoing in other states.
- Edits and publishes Technology News Transfer, a quarterly report aimed at keeping the Department's engineers informed of technological advances that may impact their work.
- Designs, constructs, installs, calibrates, and repairs electrical instrumentation.
- Administers Research In Progress Tracking Systems for Region I Research Advisory Committee to the AASHTO Standing Committee on Research.

Capabilities/Equipment

- Staff experience with following software applications:
  - Desk-top Publishing: First Publisher, Newsroom
  - Expert Systems: Exsys, Insight 2+, Prolog.

- ♦ Communications: Crosstalk, Procomm.
- ♦ Presentation Graphics: Chartmaster, Signmaster, Freelance, PC Paint
- ♦ Programming: Turbo Pascal, APL Plus 5.0, Q Basic, Fortran, C
- ♦ Numerical Analysis: MathCad, Q-Solver, TK Solver
- ♦ Traffic Packages: TRAF-NETSIM, TRANSYT TF
- ♦ Statistical Packages: SAS, Statgraphics, Mystat, Solo, Statxact, Survcalc

- ❑ Machine shop.
- ❑ Audiovisual equipment.
- ❑ Maintains schedule for use of the garage.
- ❑ Electronics Lab
- ❑ Graphics Assistance:
  - ♦ Slides
  - ♦ Overheads
  - ♦ Tabular Presentations
- ❑ Equipment, software, hardware inventory.
- ❑ Computer Support:
  - ♦ IPX Sun Workstation
  - ♦ 386 p/c
  - ♦ 286 p/c

MATERIALS BUREAU

It is the mission of the Materials Bureau to provide a quality assurance (QA) program for materials incorporated into Department projects, materials engineering services for design and construction, evaluation of material performance, and technology transfer.

The Bureau fulfills this mission as follows:

- Specifies, through materials engineering, the appropriate material characteristics, construction techniques, and levels of quality.
- Assures, through inspection and testing, that materials incorporated in a project are what was specified.
- Monitors materials performance, and evaluates and implements materials and construction technology.
- Provides a complete range of laboratory testing, noise measurement, and pavement friction testing services.
- Supports regional offices in their materials programs by providing equipment, supplies, staffing support, and related services.
- Provides training to Department design, construction, and maintenance personnel as it relates to materials.
- Provides overall direction and management of the materials program.

The Materials Bureau is comprised of the Director's Office and seven laboratory, engineering, and product operations sections with the following responsibilities:

DIRECTOR' S OFFICE

Administration Unit

- Provides overall administrative support services to the Bureau, including accounting, budgeting, purchase, personnel, inventory, forms and publication control, vehicle procurement, maintenance of files, operation of shipping and receiving dock, and clerical support.
- Manages procurement and disbursement of sampling and testing supplies to regional materials units, as well as sampling supplies and forms to consultant inspection agencies.

- Manages the materials sampling, testing and inspection consultant contracts used by regional materials units, the Structures Division, and the Materials Bureau.
- Maintains Bureau files including:
  - Complete set of active construction contract documents
  - Bureau test reports
  - Bureau correspondence

PRODUCT OPERATIONS SECTION

Services Provided

- Develops and operates QA programs for specific construction materials, including cement, bituminous liquids, reinforcing steel, bridge bearings, and precast concrete items. QA activities include:
  - Serving as the primary contact in the Department for industries engaged in manufacture and/or fabrication and supply of these materials to Department construction projects.
  - Coordinating materials sampling and inspection among suppliers, regions, and consultant inspection agencies.
  - Directing activities of consultant inspection agencies at various locations within New York State, as well as throughout the United States and Canada.
  - Taking final (accept/reject) action on test results with attendant communication of the action to suppliers and regions.
- Develops and administers the "Materials Inspection Manual," which is also Part 2A of MURK.
- Coordinates the off-site quality assurance effort performed by the Department for the New York City Department of Transportation.

GENERAL ENGINEERING SECTION

Services Provided

- Performs materials engineering functions related to materials and equipment performance, construction application methods, safety issues, and economics in design, construction, and maintenance of transportation facilities.
- Develops QA programs for various manufactured products and materials, such markings, reflective sheeting, etc.
- Evaluates products for use as construction items in Department

contracts, establishes approved product lists, and prepares materials data sheets. Some examples are: thin polymer overlays, elastomeric concrete, protective coatings, delineation devices.

- ❑ Investigates and reports materials failures, determines causes of problems,recommends solutions, and documents performance.
- ❑ Develops specifications, construction methods, and special tests relating to materials, equipment, and construction practices.
- ❑ Trains personnel in application of materials standards and testing methods pertinent to construction; e.g. , paint inspection, pavement marking inspection, installation of joint and crack sealers/fillers, etc.
- ❑ Provides special testing services, including pavement friction testing and noise measurements.
- ❑ Develops and maintains computer data bases for certain materials-related areas to support the design and construction program.
- ❑ Provides equipment services including procurement, periodic calibration, and loan of specialized equipment for use in the Department's construction program -- e.g. , noise measuring meters.
- ❑ Develops and implements policies and programs for dealing with certain construction materials -- e.g. , pavement markings, bridge bearings, pavement joint and crack sealers/fillers, structural paints.
- ❑ Provides liaison with commercial producers, construction and professional organizations, and other governmental agencies.
- ❑ Disseminates information on new technical developments to federal, state, and local agencies.

Capabilities/Equipment

- ❑ Noise measurement meters, Nagra dual-channel sound-level recorder, B&K one-third octave band analyzer.
- ❑ Pavement friction measurement system conforming to ASTM E 274.
- ❑ Magnetic paint-film-thickness gage.
- ❑ Thin protective coating adhesion tester.
- ❑ Bridge deck overlay adhesion tester.
- ❑ Flux continuity tester.
- ❑ Coating holiday tester.
- ❑ Flexible-delineator-post impact tester.

Unique Files

- ❑ Computer data files including concrete cylinder strength data, aggregate friction inventory data, bridge deck potential data, and bridge deck delamination files.

- ❑ Test data files on various materials, appurtenances, and construction equipment.
- ❑ Technical reference files, texts, and reports on various materials, appurtenances, construction equipment practices.

FIELD ENGINEERING I

Services Provided

- ❑ Provides engineering services and technical reports for materials used in pavements, structures, dams, locks, drainage facilities, and concrete appurtenances.
- ❑ Develops specifications, evaluates new products and technology, and provides materials-related training. Primary materials include:
  - ♦ Portland cement concrete pavement and structures
  - ♦ Precast concrete products and concrete pipe
  - ♦ Metal and plastic pipe drainage materials
- ❑ Provides evaluations and recommendations for rehabilitation and/or repair of pavements, structures, dams, locks, drainage facilities, and other facilities/appurtenances.
- ❑ Provides consultation and engineering assistance in design, construction, maintenance, testing, and QA.
- ❑ Manages and publishes the NYSDOT "Approved Lists for Materials and Equipment" for use on NYSDOT projects.
- ❑ Provides services for specialized concrete bridge deck overlay systems, including mix designs, training, assistance, evaluations, and repair recommendations.
- ❑ Provides on-site portable concrete coring services and testing to regional and Main Office units for design and construction.
- ❑ Provides microcomputer assistance, training, and programming related to the Materials program area.
- ❑ Coordinates new or special product evaluations for NYSDOT.

Capabilities/Equipment

- ❑ On-site nuclear-gage concrete-density measurement (Troxler nuclear gage services).
- ❑ On-site rapid testing evaluations:
  - ♦ Electrical potential surveys
  - ♦ Covermeter and delamination detection surveys

- Swiss hammer, rebound hammer, pulse velocity, and Windsor probe testing

- Materials program area video operations:
  - Production/recording
  - Editing/dubbing
  - Materials-related training video distribution

FIELD ENGINEERING II

Services Provided

- Provides engineering services, develops quality assurance programs, and conducts plant inspections for the two major field-produced materials -- portland cement and asphalt concrete. Provides inspections of liquid bituminous materials (emulsions) facilities.
- Develops specifications for the above listed materials.
- Evaluates new products and technologies, including asphalt additives, to improve asphalt concrete pavement performance.
- Provides materials engineering assistance to Design, Construction, Maintenance, and the regions. Included in this activity are existing asphalt concrete pavement evaluations and treatment selections in accordance with Volume I and II of the Pavement Rehabilitation Manual.
- Manages the Independent Assurance Sampling and Testing program (IAST), and the BAMS production quantity totaling systems.
- Coordinates training of regional personnel in performing plant inspections and field testing of concrete (ACI Certified program).
- Develops procedures for recycling existing pavements, including hot-mix recycling using asphalt concrete plants and in-place recycling using both hot surface and cold techniques.
- Manages the pavement coring program and profilograph pavement roughness measuring program.

CHEMICAL TESTING LABORATORY

Services Provided

- Performs materials testing of a chemical nature on a variety of engineering materials. Primary materials tested include asphalt cement and emulsions; portland cement; fine aggregate; epoxy;

stainless and high-strength bolts, nuts, and washers; structural paint; neoprene joint sealer; fencing; highway marking materials (thermoplastic and traffic paint); concrete water and admixtures.

- Recommends routine acceptance/rejection actions for construction materials to support the QA function of the Bureau.
- Performs chemical testing to support various Department engineering activities. This includes such testing as chloride content in hardened concrete; bituminous concrete mix designs; PCB analysis of water and sediment samples for Soils and Waterways; sulfates in soils; heavy metals and chlorides in soils, recycled concrete, and sediment.
- Performs laboratory evaluations of asphalt laboratory facilities as part of the QA program.
- Provides training to regional inspectors in asphalt cement concrete sampling, testing, and inspection.
- Participates in AMRL and CCRL proficiency sample programs for bituminous materials and mixes, cement, and paint. The lab is accredited by AASHTO for all routine tests on asphalt cement and emulsions.

Capabilities/Equipment

- Atomic absorption spectrophotometer - Chemical analysis of cement, paint pigments, and various other items that can be put into solution. Determination of hazardous elements in solid waste according to EPA SW-846. Determination of chlorides in concrete.
- Atomic emission spectrometer - Determination of the elemental composition of metals including stainless steel, high-strength steel, and aluminum alloys.
- Atomic emission spectrograph - Qualitative elemental analysis of unknown solid samples.
- Gas chromatograph - Determination of PCB's in water and sediment samples and other volatile materials.
- Infrared spectrophotometer - Qualitative determination of organic materials in samples such as paint, latex, and concrete admixtures.
- Ultraviolet-visible spectrophotometer - Determination of chemical species in solution such as sulfate in soils, DCI in precast concrete, and detergents in water.
- Salt spray cabinet - Evaluation of the effect of salt water on samples such as coated steel products.
- Weatherometer - Evaluation of the effect of sun and rain on materials such as paint, epoxy, and other coatings.

PHYSICAL TESTING LABORATORY

Services Provided

- Performs materials testing of a physical nature on a variety of engineering materials. Primary materials tested include fine and coarse aggregate, cement, pozzolans, fly ash, grout, epoxy, concrete additives, curing compounds, concrete cylinders and cores, precast concrete units, reinforcing bars, wire strand, bolts, guide rail, plastic pipe, bearings, joint sealer and other rubber and neoprene materials.
- Recommends routine acceptance/rejection actions for construction materials to support the QA function of the Bureau.
- Performs physical testing to support various Department engineering activities. This includes portland cement concrete mix trial batches, air content in hardened concrete, freeze-thaw testing for various materials, and specimen preparation for examination and testing.
- Participates in AMRL and CCRL proficiency programs for cement, aggregate, and portland cement concrete. The lab is accredited by AASHTO for all routine tests on portland cement concrete.
- Repairs and maintains existing test equipment and builds new test equipment for the three Technical Services Bureaus and other Department units.
- Provides training to regional concrete inspectors in portland cement concrete sampling and testing, including ACI certification.
- Coordinates regional materials laboratory program, including providing lab equipment, evaluating test equipment and lab test procedures, AMRL and CCRL proficiency samples, and training lab technicians as necessary.

Capabilities/Equipment

- Universal testing machines - tensile and compression force tests
  - Range 0-600 K at constant rate of load
  - Range 0-30 K at constant rate of crosshead movement (inch/minute)
- Stress/strain recorders - measure and record stress/strain data for various materials in tension or compression tests.
- X-ray machine - examination of various metals and welds.
- Hardness testers - Brinell and Rockwell on metal specimens.
- Drop-weight tear testing of metal.
- High-pressure air meter - measure air content of hardened concrete specimens.

- Linear traverse air content - microscopic examination of hardened concrete.
- Freeze-thaw chambers - testing of concrete and aggregate samples.
- Alkali/aggregate reaction testing by expansion.
- Concrete mixer - capability to produce trial concrete batches.
- Calibration equipment - verify force test machines (0-600 K), thermometers, pressure gages (0-10,000 psi), vacuum measurements.
- Full machine shop capabilities.

ENGINEERING GEOLOGY SECTION

Services Provided

- Coordinate the aggregate QA program, including the sampling, testing and performance evaluation of aggregates.
- Develops specifications for aggregate materials used in portland cement and asphalt concrete; evaluates new aggregate products and technologies.
- Conducts geological investigations of Department aggregate sources.
- Takes final (accept/reject) action on aggregate test results with attendant communication of the action to the regions. The Section also maintains a testing history of all aggregate sources.
- Manages and publishes "Approved List of Sources of Fine and Coarse Aggregates" for use on NYSDOT projects.
- Reviews and takes final (accept/reject) action on Geologic Source Reports required for all Department aggregate sources. The Section also maintains an operational history of all aggregate sources.
- Provides consultation and geotechnical assistance in evaluating aggregate-related pavement and structure problems. This includes evaluation of aggregates as pavement friction providers.
- Coordinates recycled waste product aggregate evaluations for the Department.
- Provides training to Departmental personnel in aggregate evaluation procedures.

Capabilities/Equipment

- Laboratory aggregate techniques - carbonate staining identification, insoluble residue determination, and petrographic analysis.
- Thin-section equipment - Preparation of thin sections for sand and drilled core analysis, special evaluations and failure examinations, using microscopy techniques.
- Petrographic microscope - Rock and mineral identification and asbestos determination.
- Ultraviolet fluorescence lamp - Identification of silica gel product of alkali-silica reaction.

SOIL MECHANICS BUREAU

It is the mission of the Soil Mechanics Bureau to provide all the geotechnical engineering services in the specialty of earthwork and foundation engineering needed by the Department's programs for the solution of soil, rock, and groundwater problems.

The Bureau fulfills this mission as follows:

- Manages, on a Department-wide basis, those portions of the Department's programs concerned with earth, rock, and groundwater engineering studies.
- Coordinates technical activities of all Department units involving problems related to soils, foundations, and geology.
- Directs operations of the Main Office soils program and technical operations of the Regional Soil Sections.
- Provides earth engineering services for design, construction, and maintenance of highways, buildings, bridges, airports, railroads, ports, and waterways.
- Develops plans, policies, and procedures for fiscal management, purchasing, and personnel development for the Main Office and Regional Soils Sections.
- Monitors quality assurance of Main Office and Regional Soils and Regional construction groups concerning all aspects of the soils drilling, sampling, testing, materials acceptance, construction control, and engineering services.

The Soil Mechanics Bureau is composed of the Director's Office, an Engineering Geology Section, a Laboratory Section, and five Engineering Sections with the following responsibilities:

DIRECTOR'S OFFICE

The Director's Office provides overall management for the soils program and directly manages and supervises all Soil Mechanics Bureau activities. The Director's Office is the focal point for contact with upper Department management, regions, industry, FHWA, and various national organizations such as AASHTO, ASTM, TRB, and training activities.

Administration Unit

Services Provided

- ❑ Furnishes accounting, budgeting, purchasing, personnel, clerical, filing, and stenographic services to the Bureau.
- ❑ Provides services for procurement of state vehicles, equipment and supply inventory, and employee safety.
- ❑ Maintains the stockroom for all Main Office, office and laboratory supplies; regional laboratory, field testing and drilling supplies; as well as program manuals and publications.

HIGHWAY DESIGN AND CONSTRUCTION SECTION

Services Provided

- ❑ Furnishes technical liaison in earthwork engineering subjects during all phases of the Department's highway projects from project initiation through construction and operation.
- ❑ Advises Regions on optimum location, position of grade line, suitability of earth materials, and on problems relating to earthwork construction; develops and evaluates specifications for earthwork, excavation, cut slopes, subgrades, subbases, riprap, slope protection, subsurface drainage, etc.
- ❑ Reviews all phases of highway plans and specifications, and advises Regions of additions or deletions necessary to economically account for earthwork and terrain conditions to be encountered.
- ❑ Assists Regions on solutions of earth engineering problems encountered during construction.
- ❑ Promotes implementing new technology related to exploration, investigation, and solution of earth engineering problems.
- ❑ Responsible for all phases of the Department's railroad, ports, transit and airport programs related to earthwork and foundation engineering problems.
- ❑ Responsible for all soil stabilization work, including specifications, development, field calibration of equipment, and inspection and evaluation of stabilized soil material during construction.
- ❑ Responsible for the earthslope (landslide) inventory program.
- ❑ Responsible for pavement design activities including all associated field evaluation work.
- ❑ SHRP geotechnical coordination.
- ❑ Coordinates geotechnical environmental issues.

Capabilities/Equipment

- ❑ Air photo library
- ❑ Map sheet library - (USGS and NYSDOT)
- ❑ Contract proposals
- ❑ Contract plans
- ❑ Engineering Instructions
- ❑ Engineering Bulletins
- ❑ Slide and photograph files
- ❑ Microfilm file
- ❑ Saltzman projector
- ❑ Slide projector

Region 11 Unique Services:

Provides the same services as HD&C upstate, but because of the highly urbanized environment and greater emphasis on reconstruction, traffic maintenance, and structures, it has the following additional responsibilities:

- ❑ Evaluates geotechnical support required by consultants and assesses adequacy of geotechnical design services. Evaluates adequacy of consultant and in-house geotechnical designs, particularly as relating to restrictions imposed on these designs in the New York City environment.
- ❑ Guides geotechnical designs, details, and specifications of consultants and Department designers with particular attention to specialized soil-structure interaction problems affecting structure elements such as caissons, bored-in piles, post grouted bored-in caissons and piles, earth and rock anchors, tied back walls, braced excavations, sheeting, soldier pile and lagging walls, pile load testing, etc.
- ❑ Assists Regional construction on all aspects of geotechnical problems including the project's effect on adjacent facilities.
- ❑ Monitors and documents performance of major geotechnical projects to improve future designs and construction performance.
- ❑ Provides appropriate technology transfer to Region 11, including formal training sessions and office and field support for design, construction, and maintenance.

ROADWAY FOUNDATION SECTION

Services Provided

- Conducts investigations and analyses, and prepares reports pertaining to design, construction, and performance of foundations for embankments, earth slopes, dams, dikes, and other earth structures.
- Develops and evaluates methods, techniques, and specifications for foundation treatments.
- Provides specialty services for slope stability, settlement, landslides, erosion control, geosynthetic applications, and special earthwork problems.
- Provides support in the investigation of liquefaction potential of soils under earthquake forces.
- Provides assistance in the design of storm water recharge basins.
- Provides specialty services in the area of pipelines and pipe culverts.
- Provides field instrumentation, installation, and monitoring for design, construction, and post-construction evaluation of horizontal and vertical ground movements and groundwater pressures.
- Performs field vane shear tests to measure soil strength.

Capabilities/Equipment

- Slope indicators
- Theodolite
- Piezometers
- Tape extensometer
- Tiltmeter
- Truck scales
- Field vane-test equipment

STRUCTURE FOUNDATION SECTION

Services Provided

- Provides geotechnical support for all structure/soil interactions, primarily for Structures Division, with considerable support to the regional design and construction staff, including field problems.
- Conducts foundation engineering investigations and analyses, and

prepares reports pertaining to design, construction, and performance of foundations for bridges, large-diameter pipes, walls, and similar structures.

- ❑ Performs and evaluates special field testing such as static and dynamic pile load tests, including determination of pile bearing capacity and/or damage to piles.
- ❑ Develops and evaluates methods, techniques, and specifications for structure foundation construction.
- ❑ Performs geotechnical evaluation of new products (proprietary walls, pipes, etc.)
- ❑ Operates videotaping equipment to document construction operations and trains personnel in its use.
- ❑ Furnishes all drafting and related services to all Bureau units.
- ❑ Operates CADD equipment for preparing drawings and visual aids.

Capabilities/Equipment

- ❑ Pile driving analyzers
- ❑ Oscilloscope
- ❑ CAPWAP and WEAP systems
- ❑ 1 Panasonic WV3250 video camera (VHS format)
- ❑ 1 Quasar VM-27AC video camera (S-VHS format)
- ❑ 1 Panasonic AG 1950 multi-function video cassette recorder (VHS format)
- ❑ 1 NEC 25-in. autocolor monitor
- ❑ CADD workstation - (Interpro 120)
- ❑ CADD PC workstations
- ❑ Videotape library
- ❑ Videotape editing unit

SUBSURFACE EXPLORATION SECTION

Services Provided

- ❑ Provides technical supervision for all subsurface explorations progressed by or for the Department, such as drilling, probing, hand auguring and coring soil and rock.
- ❑ Sets standards, monitors quality of state and contract drilling, and oversees drill inspection contracts.

- Progresses terrain reconnaissance and earth materials resource surveys. Prepares reports for physical environment studies, including wetlands, flood plains, erosion potential, and other physical aspects, such as hypsographic maps, slope maps, unconsolidated aquifer situation maps, and climatological data.
- Conducts all geotechnical engineering activities for the Waterways Division, including canal bottom sampling for dredging permits.
- Establishes specifications and sets standards for and controls inventory of all drilling equipment and supplies for the regional soils drilling programs.
- Designs building foundations, dams, and canal structure foundations.
- Supervises drilling aspects of all subsurface instrumentation.
- Provides recommendations on concrete and masonry coring (deep work).
- Provides recommendations on drilling operations on waterbodies.
- Serves as liaison between Department and U.S. Department of Agriculture on a cooperative, long-term research project (Statewide Soil Survey Mapping).
- Provides recommendations on sealing of borings and wells.
- Responsible for statewide operation of the Dutch cone penetrometer and other specialized drilling operations.

Capabilities/Equipment

- Published groundwater resource bulletins, stream flow data, flood plain maps, etc.
- File of all published terrain reconnaissance reports.
- State building foundation files.
- Noise logging dosimeter for monitoring of noise exposure.
- Clamshell type river bottom sampler.
- Mirror stereoscope.
- Field water quality testing (Hach field chemical test kit).
- Pressure pumps.

ENGINEERING GEOLOGY SECTION

Services Provided

- Advises the Bureau and Department on design problems of a

geologic nature involving rock:

- ♦ Design of rock slopes for new alignments and remedial work.
- ♦ Determination of allowable bearing capacities for foundations on rock.
- ♦ Design of rock sockets for foundations in rock.
- ♦ Design of appropriate rock slope stabilization measures, including rock bolting, scaling, excavation, etc.

- ❑ Advises on construction problems of geologic nature involving characteristics of various rock formations and their associated structural features that affect engineering considerations, i.e., stability of rock slopes, bearing capacities for structural foundations, rock quality for stone fill and riprap, drillability and resistance to blasting of rock during excavation operations, and transmissibility of blasting vibrations in various rock types.
- ❑ Provides technical assistance concerning blasting safety and conformance to specifications, conducts preblasting meetings, and evaluates all blasting plans for rock excavation, blasting permits, and demolition.
- ❑ Provides geophysical surveys (seismic, resistivity, and vibration monitoring) for all Department planning, design, construction, and maintenance activities.
- ❑ Conducts investigations, designs and prepares specifications for groundwater supplies.
- ❑ Advises on procedures for obtaining suitable water supply from subsurface aquifers during well construction operations, including inspection services and pump tests.
- ❑ Conducts groundwater evaluations (salt contamination, dye tests).
- ❑ Provides input for earthquake (seismic) designs and standards.
- ❑ Maintains statewide rock slope inventory.
- ❑ Organizes, directs, and implements blasting operations to assist Department maintenance staff and communities throughout the state in conducting corrective procedures involving rockslides, unstable rock slope, sight distance, and fixed obstacle problems.
- ❑ Advises on the alleviation of ice jams and performs blasting if requested.

Capabilities/Equipment

- ❑ Licensed blasters
- ❑ Blasting machines
- ❑ Explosive magazines (cap and powder) at strategic locations in Region 1 (Warrensburg and Defreestville) and Region 8 (Luddingtonville)

- ❑ Lightning detectors
- ❑ Air horns
- ❑ Bullhorns
- ❑ Two-way voice activated communicators
- ❑ Vibration monitoring seismographs
- ❑ Ice augers
- ❑ Blasting mats
- ❑ Research model vibration monitoring seismograph
- ❑ Remote data loggers with piezometers (well monitoring)
- ❑ 24 trace seismographs
- ❑ Electrical resistivity unit
- ❑ Plane table
- ❑ Generator - 3500 watt
- ❑ Deep-well pumps

SOIL LABORATORIES SECTION

General Soils Laboratory Unit

Services Provided

- ❑ Conducts laboratory tests and field testing and provides technical assistance for numerous routine and special earthwork needs.
- ❑ Conducts tests including identification, compaction, and gradation for design and construction control of earthwork and related items.
- ❑ Conducts tests for the stabilization of soils for various subgrade, subbase, base, and shoulder purposes, using bituminous materials, portland cement, hydrated lime, fly ash, salt, and various other stabilizing agents.
- ❑ Conducts gradation, soundness and plasticity tests for the approval/rejection of granular materials for construction.
- ❑ Conducts tests for the approval/rejection of topsoil used on Department projects.
- ❑ Provides technical direction to the Regional Soils laboratories and field earthwork construction control testing operations.
- ❑ Designs and conducts specialized tests necessary to evaluate the use of waste and recycled materials.

- ❑ Conducts training of permanent and temporary personnel for earthwork inspection on a statewide basis.
- ❑ Provides statewide field services to implement earthwork construction.
- ❑ Monitors and controls nuclear moisture-density test equipment and procedures for the Main Office and regions.
- ❑ Conducts quality assurance program for Main Office and Regional Laboratory testing.
- ❑ Conducts, evaluates and participates in quality assurance (QA) programs for Main Office, Regional laboratory, and construction inspection staffs such as:
  - ♦ AMRL: AASHTO Materials Reference Lab Program (participant).
  - ♦ SMRL: Soil Mechanics Reference Laboratory Program (participant as well as manager) for all Main Office, Regional Soils, and IAST participants.
  - ♦ IAST: Independent Assurance Sampling Testing Program (responsibility for training and overseeing all aspects regarding the soils portion of this program).
  - ♦ Inspects and monitors Regional laboratories regarding equipment and procedures.
  - ♦ Conducts earthwork inspector's schools to train Regional soils and construction staffs and temporary construction inspectors.
- ❑ Conducts routine maintenance (inspection, calibration and repair) of all equipment, with overall responsibility for maintaining adequate inventories as well as ordering of all equipment and supplies for Main Office, Regional Laboratory and field earthwork construction operations.

Capabilities/Equipment

Granular material, soil classification, soil stabilization, topsoil, recycled material, waste material and compaction testing.

Soil Mechanics Laboratory Unit

Services Provided

- ❑ Designs and conducts tests related to use of earth in its natural state for support of embankments, cut slopes, pavements, bridges, buildings, dams, and other structures.
- ❑ Performs routine design test programs in determining strength, consolidation, and permeability characteristics and routine acceptance/rejection of geosynthetics.

- ❑ Designs and conducts specialized geotechnical testing for solution of specific problems, including geosynthetic testing, instrumentation testing, and others.
- ❑ Performs model studies for solutions to geotechnical problems (pipe filters, piles, walls, etc.)
- ❑ Monitors and evaluates soil identification practices for Main Office, Regions, and consultants. Provides schools as needed.
- ❑ Provides leadership in American Society for Testing and Materials (ASTM), International Organization for Standardization (ISO), and other professional organizations for geosynthetics testing and acceptance procedures.

Capabilities/Equipment

- ❑ Strength, consolidation, permeability, geosynthetic testing.
- ❑ MicroVax II computer dedicated to lab test operations (TACT).
- ❑ Hewlett/Packard Model 87 computer dedicated to lab test operations

SPECIFICATIONS AND STANDARDS SECTION

Services Provided

- ❑ Conducts major special projects to investigate, develop, and implement improvements in geotechnical engineering operations of the Bureau, and supports operating sections through technical assistance in effecting innovations. Projects are assigned by the Director and may involve any of the following in a given period:
  - ♦ Develops new geotechnical specifications to be incorporated into the Department's standard specifications.
  - ♦ Performs HP&R formal research projects as principal investigators on topics in the geotechnical field.
  - ♦ Designs and develops specialized custom equipment for laboratory and/or field usage.
  - ♦ System analysis, design, and implementation of computer application programs and internal Soils Bureau automation projects.
  - ♦ Develops new design, field, or laboratory test methods, procedures, or other standards.
- ❑ Provides the Bureau with sustained technical support:
  - ♦ System management of local Digital minicomputer systems and application support of their custom software.
  - ♦ Maintenance and repair for TACT station hardware.

- Centralized hardware and software support for microcomputers.
- Application development and database administration for Bureau systems on the IBM mainframe.
- Staff training in computer applications.

The Second Edition was prepared in August 1992 by Rick Bennett using the desktop publishing package *Key Publisher v.1.12.*

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